

WHAT IS CLAIMED IS:

1. A method for forming a conductive pattern for a semiconductor device, comprising:

5 patterning a mask layer outwardly from a conductive layer of the semiconductor device, the patterning defining portions of the conductive layer where vias through the conductive layer are desired;

10 exposing the semiconductor device to a plasma, the plasma converting the unmasked portions of the conductive layer into a compound; and

15 exposing the semiconductor device to a treatment process, the treatment process selectively removing the compound.

2. The method of Claim 1, wherein the conductive layer comprises a copper material.

3. The method of Claim 1, further comprising removing the mask layer from the semiconductor device.

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4. The method of Claim 3, wherein removing the mask layer comprises removing the mask layer after removing the compound.

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5. The method of Claim 3, wherein removing the mask layer comprises removing the mask layer before removing the compound.

6. The method of Claim 1, wherein exposing the semiconductor device to a treatment process comprises:

exposing the semiconductor device to a substantially inert atmosphere; and

5 heating the semiconductor device to between 300 and 600 degrees Celsius to remove the compound.

7. The method of Claim 1, further comprising providing a barrier layer between the conductive material  
10 and a substrate of the semiconductor device.

8. The method of Claim 1, wherein the conductive material comprises a copper material, and wherein exposing the semiconductor device to a plasma comprises  
15 exposing the semiconductor device to a chlorine-containing gas.

9. The method of Claim 8, wherein the compound comprises a copper chloride material, and wherein exposing the semiconductor device to a treatment process comprises exposing the semiconductor device to a hydrogen chloride solution to remove the copper chloride material.  
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10. The method of Claim 1, wherein the mask layer  
25 comprises a photoresist material.

11. A method for forming a conductive pattern for an electronic device, comprising:

forming a conductive layer outwardly from a substrate of the electronic device;

5 patterning a mask layer outwardly from the conductive layer, the patterning defining portions of the conductive layer where vias through the conductive layer are desired;

10 exposing the electronic device to a plasma, the plasma converting the unmasked portions of the conductive layer into a compound;

exposing the electronic device to a treatment process to selectively remove the compound; and

15 removing the mask layer from the masked portions of the conductive layer.

12. The method of Claim 11, wherein removing the mask layer comprises removing the mask layer before removing the compound.

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13. The method of Claim 11, wherein forming a conductive layer comprises forming a copper layer outwardly from the substrate.

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14. The method of Claim 11, wherein exposing the electronic device to a plasma comprises exposing the electronic device to a plasma, the plasma comprising a gas having an element selected from the halogen group of elements.

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15. The method of Claim 11, further comprising providing a barrier layer between the conductive layer and the substrate of the electronic device.

16. The method of Claim 11, wherein exposing the electronic device to a plasma comprises controlling the exposure of the electronic device to the plasma to form a substantially perpendicular interface between the masked conductive material and the compound.

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17. The method of Claim 11, wherein patterning a mask layer comprises patterning a photoresist layer outwardly from the conductive layer.

18. A method for forming a conductive pattern for an electronic device, comprising:

5 masking a portion of a conductive layer of the electronic device, the masked portion of the conductive layer defining the conductive pattern;

10 exposing the electronic device to a plasma, the plasma converting an unmasked portion of the conductive layer into a compound; and

15 exposing the electronic device to a treatment process, the treatment process selectively removing the compound.

19. The method of Claim 18, wherein masking a portion of a conductive layer comprises depositing a 15 photoresist layer outwardly from a portion of the conductive layer.

20. The method of Claim 19, further comprising removing the photoresist layer after removing the 20 compound.

21. The method of Claim 19, further comprising removing the photoresist layer before removing the compound.

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22. The method of Claim 18, wherein exposing the electronic device to a plasma comprises exposing the electronic device to a plasma, the plasma comprising a gas having an element selected from the halogen group of 30 elements.

23. The method of Claim 22, wherein the plasma comprises a chlorine-containing gas.

24. The method of Claim 22, wherein the plasma 5 comprises a bromine-containing gas.

25. The method of Claim 22, wherein the plasma comprises a fluorine-containing gas.

10 26. The method of Claim 22, wherein the plasma comprises an iodine-containing gas.

27. The method of Claim 18, wherein exposing the electronic device to a plasma comprises controlling the 15 exposure of the electronic device to the plasma to form a substantially perpendicular interface between the masked conductive material and the compound.

28. The method of Claim 18, wherein the conductive 20 layer comprises a copper material.

29. The method of Claim 28, wherein exposing the electronic device comprises exposing the electronic device to a plasma, the plasma comprising a chlorine-containing gas, the plasma converting the unmasked 25 portion of the conductive layer to copper chloride.

30. The method of Claim 29, wherein exposing the electronic device to a treatment process comprises exposing the electronic device to a hydrogen chloride solution to remove the copper chloride.